Lesson 14

Surveillance Issues in Developing Countries

Instructor's Guide Form

Lesson Title: Surveillance issues in developing countries

Lesson Goal: For each learner to be able to describe the key surveillance issues in developing countries

Lesson Objectives: By the end of the lesson, each learner will be able to:

1) describe how surveillance is conducted in developing countries
2) discuss the key issues relating to surveillance in developing countries
3) define key terminology used in surveillance in developing countries
4) describe the planning process for surveillance in developing countries
5) describe population-based surveillance
6) describe the building of integrated surveillance systems

Equipment and Materials Needed:

- Overhead projector
- Handout: Surveillance Grid, Table 13-4 p. 240-241
- Transparencies #14.1 - #14.24

Time Required: 45 minutes (90 minutes with exercises and discussion)

Synopsis of lesson: This lesson describes key surveillance issues relevant to developing countries.

Return to Surveillance in a Suitcase-Table of Contents CD 98': Main Menu

Lesson 14

Surveillance Issues in Developing Countries

Instructor's Guide Form (continued)

Adult Education Application: The discussion regarding developing countries can provide the learners opportunities to apply information to unfamiliar settings, serving as a capstone experience for the entire course. The instructor could present a case of a fictitious country, detailing specific public health, political, social, and economic characteristics. The instructor could then ask the learners to develop a set of public health priorities and propose a surveillance system that meets those priorities.

Lesson 14

Surveillance Issues in Developing Countries

Topical Outline

I. Conducting surveillance in developing countries
- A. Health care system
- B. Limited health-care providers and laboratories
- C. Acute diseases and injuries
- D. Potential obstacles to developing surveillance systems

II. Issues relating to surveillance
- A. Planning
- B. Data sources
- C. Surveillance at the local level
- D. Development of integrated surveillance systems

III. Terminology
- A. "Local"
- B. Population-based and facility-based

IV. Planning
- A. Identifying health objectives and linkage to surveillance
- B. Surveillance of measures of outcome versus process

Lesson 14

Surveillance Issues in Developing Countries

Topical Outline (continued)

V. Population-based surveillance

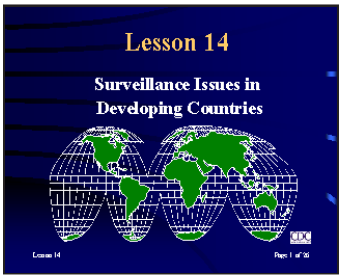
A. Importance
B. Vital-event registration
C. Regular, periodic surveys
D. Sentinel surveillance
E. Surveillance at the local level
F. Collection, display, and analysis of local surveillance data
G. Exit interviews and focus groups

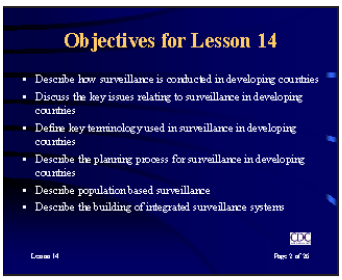
VI. Building integrated surveillance systems

A. EPI surveillance model
B. Role of HIV
C. Integration of surveillance and evaluation for programs
D. Focus on outcomes
E. Sophistication of tools

VII. Continuing issues

A. Surveillance issues
B. Sentinel sites
C. Linkage of health objectives to surveillance
D. Key factors in implementing surveillance systems
E. Surveillance and the public health community





Lesson 14

Surveillance Issues in Developing Countries

Content Outline

Lesson Objectives:

- **Describe how surveillance is conducted in developing countries**
- **Discuss the key issues relating to surveillance in developing countries**
- **Define key terminology used in surveillance in developing countries**
- **Describe the planning process for surveillance in developing countries**
- **Describe population based surveillance**
- **Describe the building of integrated surveillance systems**

I. Conducting surveillance in developing countries

A. Health care system

1. usually an integral part of organized government services

2. thus, fewer impediments to implementing surveillance systems

B. Limited health-care providers and laboratories

1. reduces the number of data sources

2. can facilitate quality assurance

Return to Lesson 14

C. Acute diseases and injuries

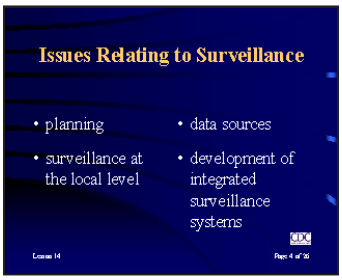
1. represent major causes of morbidity and mortality in many developing countries

2. these are conditions for which surveillance techniques are well-developed

D. Potential obstacles to developing surveillance systems

1. rudimentary record-keeping systems

2. limited resources
   a. few diagnostic laboratories
   b. less reliable demographic and vital statistics
   c. inadequate infrastructure



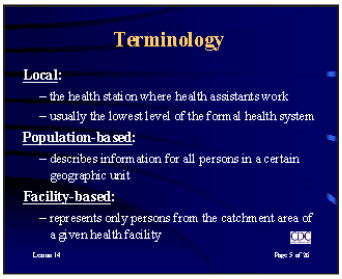
II. Issues relating to surveillance

A. Planning

B. Data sources

C. Surveillance at the local level

D. Development of integrated surveillance systems



III. Terminology

A. " Local"

1. refers to health station where health assistants work

2. usually the lowest level of the formal health system

B. Population-based and facility-based

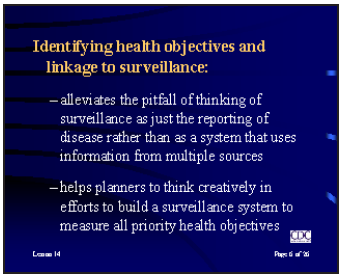
1. population-based describes information for all persons in a certain geographic unit

Return to Lesson 14

2. facility-based information represents only persons from the catchment area of a given health facility

IV. Planning

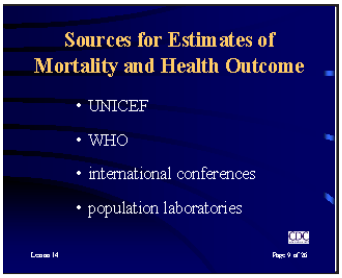
A. Identifying health objectives and linkage to surveillance

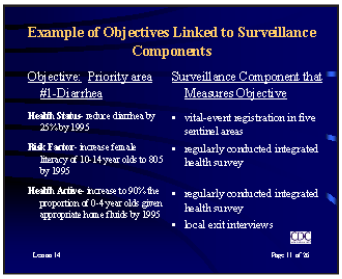


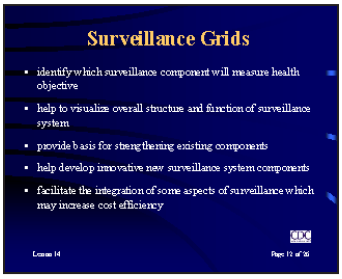
1. priority activity
    a. identifying measurable health objectives
    b. assigning them priority
    c. linking surveillance to those objectives
2. purpose of linking surveillance to ordered health objectives
    a. alleviates the pitfall of thinking of surveillance as just the reporting of disease rather than as a system that uses information from multiple sources
    b. linking helps planners to think creatively in efforts to build a surveillance system to measure all priority health objectives

3. basic surveillance components for use in building a surveillance system in developing countries
    a. case definition
        1) keep it simple
        2) use terms familiar to the country
        3) WHO has some case definitions for use in the field
    b. case reports
        1) from health stations or hospitals
        2) from sentinel sites
    c. births and deaths
        1) from hospitals
        2) from sentinel sites
        3) complete ascertainment (population-based methods)

Return to Lesson 14







d. laboratory reports (usually from hospitals)
e. sample surveys (particularly cluster surveys - population-based methods)

4. bases for health objectives

a. health impact
b. feasibility of intervention
c. cost-effectiveness of the intervention

5. sources for estimates of mortality and health outcome

a. UNICEF
b. WHO
c. international conferences
d. population laboratories

6. problems with relying on data from other countries

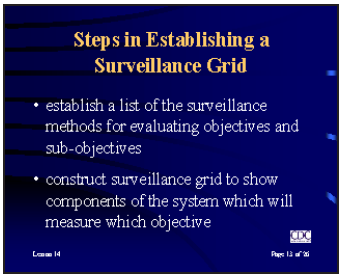
a. difficulties may arise for conditions for which impact is not clearly known
    1) hepatitis B
    2) iodine deficiency
    3) malaria
b. difficulties may arise for emerging health problems
    1) HIV
    2) tobacco use
    3) motor-vehicle injuries
c. for each health objective, the surveillance method for evaluating that objective and sub-objectives should be listed

7. Surveillance grid
    a. identifies which surveillance component will measure a health objective
    b. advantages of surveillance grid

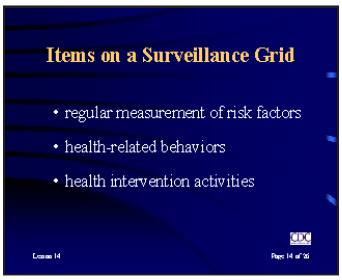
Return to Lesson 14

1) helps to visualize the overall structure and function of the surveillance system
2) provides a basis for strengthening existing components
3) identifies existing information that could measure objectives
4) helps to develop innovative new surveillance system components
5) facilitates the integration of some aspects of surveillance which may increase cost-efficiency

c. steps in developing a surveillance grid
1) establish a list of the surveillance methods for evaluating objectives and sub-objectives
2. construct surveillance grid to show components of the surveillance system which will measure which objective



d. items to include on surveillance grid
1) regular measurement of risk factors
2) health-related behaviors
3) health intervention activities

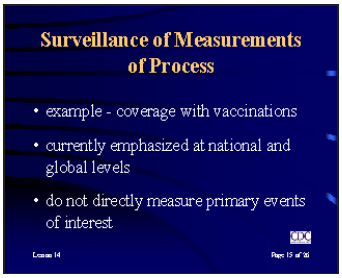


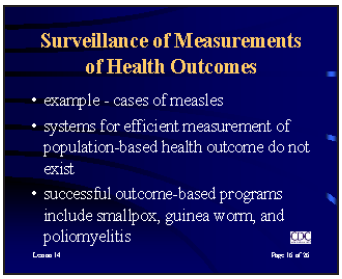
e. example: *See handout: Surveillance Grid* (see page 260)
1) diarrhea - reduce mortality by 25% by 1995
2) primary surveillance maintained by noting vital events in sentinel areas.
3) secondary surveillance maintained by noting births / deaths from health facilities

Return to Lesson 14

8. *Exercise*
    a. *form small groups*
    b. *develop a surveillance grid based on case study: each group to consider 2 diseases each, not including the examples*
    c. *have groups present to class*

B. Surveillance of measures of outcome versus process





1. Measurement of process
    a. example: coverage with vaccinations
    b. currently emphasized at national and global levels

2. Measurement of health outcomes
    a. example: cases of measles
    b. systems for efficient measurement of population-based health outcomes do not exist

3. Problems with process measures
    a. process measures do not directly measure primary events of interest
        1) death
        2) disease
    b. process measures do not directly measure the effectiveness of the processes (interventions)
    c. in contrast, the health outcome is the measure of interest, and what is measured is the effectiveness
    d. measurement accuracy
        1) in administrative methods of estimating program coverage, often both the numerator and the denominator are not accurate
        2) example: often those children who are missed by a public health program are also missing from the denominator

Return to Lesson 14

4. use of outcome measures
    a. in any international setting, surveillance for both processes and outcomes is desirable
    b. focus of surveillance should be on outcome measures
    c. successful outcome-based programs
        1) smallpox
            a) began as a process-based program
            b) switched to an outcome-based program
            c) change led to improved program effectiveness
        2) poliomyelitis
            a) outcome-based program in the Americas
            b) decreased number of cases from nearly 3,000 in 1980 to zero after 1991
        3) guinea worm

5. health outcomes can be used to measure processes
    a. exercise - given vaccine efficacies of 40% and 80% and the percent of children immunized against measles as 70% and 90%; what is the percent of the population immunized?
    b. discussAppendix 13B, page 254-255

V. Population-based surveillance

A. Importance

1. in developing countries there are disparities of access to health facilities

Return to Lesson 14

2. there are disparities of health status in urban centers versus rural areas

3. because surveillance from sentinel sites and health facilities is often concentrated in urban areas, public health needs in rural areas may not be well represented by policy makers at the national level unless population-based surveillance systems are used

B. Vital-event registration

1. most important single addition that developing countries can make to their existing surveillance systems

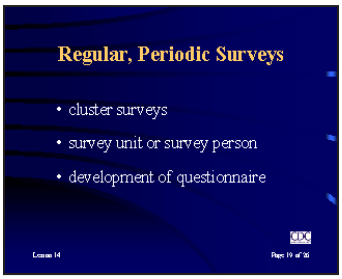
2. useful rates
    a. death rates
    b. birth rates
    c. cause-specific rates
    d. age-specific rates
    e. gender-specific rates

3. *Lay Reporting of Health Information*
    a. published by WHO, 1978
    b. can be used to classify deaths by cause
    c. lists 150 causes of death
    d. list of 30 causes that can be used by non-physicians
    e. has standard case definitions for assigning cause of death in children under 5 years old

4. registration of pregnancy
    a. should be included when establishing vital-event systems
    b. needed to measure the number of neonatal deaths
    c. measure of neonatal death used to measure infant-mortality rates

Return to Lesson 14

d. types of information gained from registration of pregnancy
    1) measurement of prenatal care
    2) fetal death associated with syphilis
    3) family planning



C. Regular, periodic surveys

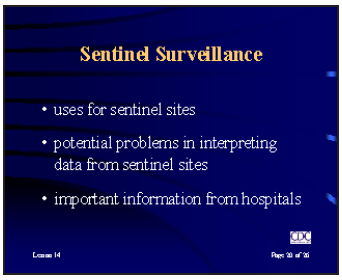
1. can be important components of a surveillance system

2. cluster surveys
    a. multistage surveys with primary sampling units
    b. most commonly used method of collecting population-based information

3. survey unit or survey person
    a. should be appointed to assure the development of periodic surveys as a component of the national surveillance system in a developing country
    b. assigned the task of coordinating all national health surveys

4. development of questionnaires
    a. previously conducted surveys can serve as models
        1) WHO
        2) CDC
    b. questionnaires should be field tested for readiness for implementation
    c. small set (10) of core questions measuring the highest-priority objectives should be included in every survey
    d. some space should be reserved for last minute questions on information desired by high-level policy makers

Return to Lesson 14



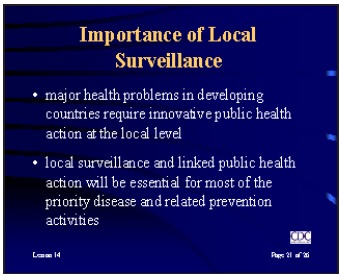
D. Sentinel surveillance

1. uses for sentinel sites
    a. to collect important information not collected at all sites
    b. to conduct a pilot collection of new information in order to be able to assess the usefulness of the data and method of collection
    c. to serve as sources of information about new conditions
    d. to determine the most effective methods for inserting newly required data into the routine collection system

2. potential problems in interpreting data from sentinel sites
    a. sentinel sites are often hospitals and tend to serve urban patients
    b. such data will not reflect rural, small, non-urban health stations where the majority of the population may live
    c. rural and small health stations should be in the sentinel-site system

3. important information from hospitals
    a. can yield information in a timely manner
    b. can yield information at a low cost
    c. cause-of-death data are available, permitting timely data collection and analysis
    d. because the number of visits and deaths is large, they yield important variables and more precise estimates
    e. data are currently available, whereas systems of vital events and regular, periodic surveys are not generally established

Return to Lesson 14



E. Surveillance at the local level

1. Training
    a. WHO has surveillance and evaluation training modules for vertical programs
    b. there are no general surveillance training modules for district or health station levels

2. Importance of local surveillance
    a. major health problems in developing countries require innovative public health action at the local level
    b. local surveillance and linked public health action will be essential for most of the priority disease and related prevention activities

F. Collection, display, and analysis of local surveillance data

1. benefits of data analysis and consequent action
    a. public health personnel and patients can see the results of data-collection efforts
    b. local staff can be involved in the process of devising strategies to solve health problems
        1) staff can be involved in attaining national and local health objectives
        2) involvement gives staff a sense of participation and professionalism

2. differences between national and local surveillance
    a. many health stations will not have mortality surveillance based on vital event registration
        1) national surveillance systems may include at least a sentinel registration component

Return to Lesson 14

        2) health stations can begin sentinel population-based mortality surveillance by starting vital-event registration in one or two villages
    b. 30-cluster surveys conduced regularly every 1-3 years are not feasible for district and health station surveillance of risk factors and health interventions
    c. resource constraints at the local level limit the number of sentinel sites
        1) however, both health stations and districts can conduct a form of sentinel surveillance by limiting data collection on some health problems to a small sample of sites at infrequent intervals
        2) example: the percentage with weight-for-age of less than 80% of standard might be calculated only once every 3 months on a consecutive sample of 30 children
    d. limited resources require integration of surveillance and nonsurveillance health information by local health workers

3. data collected routinely by health stations should be limited to high-priority conditions
4. health station should meet certain standards before reporting requirements are expanded
    a. health staff should be reporting regularly
    b. health staff should be displaying information collected
    c. health staff should be thinking about the meaning of the data

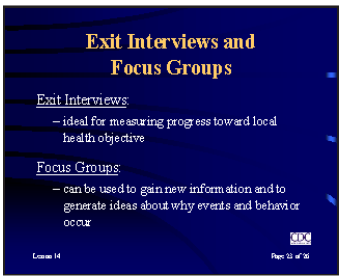
Return to Lesson 14

d. health staff should be using the data to solve health problems
e. health staff should be using the data to evaluate programs targeted at certain health problems

5. display and interpretation of surveillance data and planned action based on interpretation can be integrated into assigned duties of health workers and into the duties of their supervisors

6. employee and project work plans should also reflect health objectives and ongoing analysis and interpretation of surveillance data

G. Exit interviews and focus groups



1. exit interviews
    a. interviews of patients who have finished their visits at health facilities
    b. ideal for measuring progress toward local health objectives
    c. characteristics of exit interviews
        1) flexible
        2) easy
        3) cost-effective
        4) can be conducted frequently
    d. uses
        1) to collect data for emergent problems or for routine surveillance
        2) to evaluate performance of health workers

        3) to collect information about process health objectives, health risks, health behavior, and health interventions
2. focus groups
    a. used to gain new information

Return to Lesson 14

b. provide an appropriate first step in generating ideas about why events and behavior occur

3. health-station staff can use focus groups, along with exit interviews, to measure health objectives of local importance

VI. Building integrated surveillance systems

A. EPI surveillance model

1. surveillance for measles was relatively easy
    a. intervention was consistently and highly effective
    b. almost all infections caused a distinct, noticeable condition

2. EPI model not as successful for problems such as diarrhea, pneumonia, family planning, and malaria
    a. interventions less effective or less consistently effective
    b. outcomes of interest were more difficult to measure

B. Role of HIV

1. reporting of cases of AIDS was inadequate for immediate prevention because of lengthy incubation period

2. accurate surveillance for HIV had to rely on expensive laboratory testing

3. appearance of HIV put new emphasis on the need for surveillance of types of health behavior, the main prevention focus of HIV
    a. previously surveillance in developing countries was considered adequate if it covered disease reporting and vaccination coverage

Return to Lesson 14

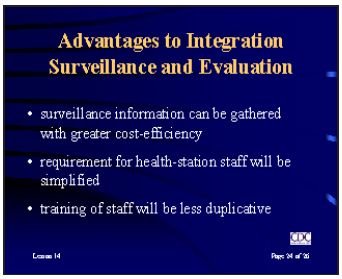
b. now, surveillance data are expected to be available on risk factors and health behavior

C. Integration of surveillance and evaluation programs

1. as public health programs become more sophisticated and public health workers need access to more information on more and more conditions, the complexity of the structure of surveillance systems will increase

2. integration will depend on actions taken by ministries of health

3. advantages to integration
   a. surveillance information can be gathered with greater cost-efficiency
   b. requirements for health-station staff will be simplified
   c. training of staff will be less duplicative



D. Focus on outcomes

1. surveillance systems must continually focus on outcomes

2. must be done to adjust strategies and interventions for control and prevention

E. Sophistication of tools

1. increasing

2. surveillance data have been analyzed with computers at the national level for the past several years

3. as prices of computer hardware have continued to decrease, computers have been moved to zonal, state, and provincial levels

Return to Lesson 14

4. *Epi Info*
    a. inexpensive
    b. freely copyable
    c. available in several languages
    d. can be used at local level

5. *Epi Map*
    a. can create maps of surveillance data automatically
    b. compatible with *Epi Info*
    c. can provide maps by district, health station, village and can be linked to surveillance data bases

VII. Continuing issues

A. Surveillance systems

1. should be linked to health objectives

2. ordered by priority

3. limited in scope

4. not burdensome at the health-station level

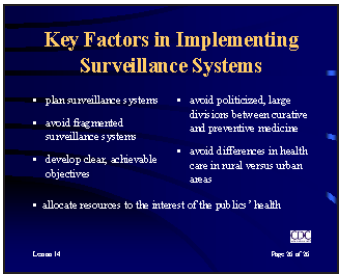
5. should have strong elements of population-based data gathering from surveys and vital-event registration

B. Sentinel sites

1. should provide the information required to monitor health objectives

2. surveillance should be flexible enough to collect new data for emerging problems and changing priorities

Return to Lesson 14



C. Linkage of health objectives to surveillance

1. leaders are able to monitor progress made toward meeting national objectives

2. local health staff can take rapid and appropriate action

D. Key factors in implementing surveillance systems

1. plan surveillance systems

2. avoid fragmented surveillance systems

3. link surveillance systems to objectives

4. develop clear, achievable objectives

5. avoid politicized, divisions between curative and preventive medicine

6. avoid differences in health care in rural versus urban areas

7. allocate resources to the interest of the public's health as determined by surveillance data

Return to Lesson 14